National Highway Visibility Web Conference
April 26, 2005

SLIDE 1 – My presentation today will be on the I-68 fog warning System using spread spectrum radio and the challenges of rural mountainous terrain.

SLIDE 2 – Hello and good afternoon - or for those joining us on the West Coast, - good morning. I am, George Small – Assistant District Engineer – Traffic, with the Maryland State Highway Administration and I will be your presenter for the last segment of the 2005 National Highway Visibility Web Conference. Joining me also is Mr. Craig Fetzer, Chief of our Communications Division, of the office of Maintenance. Mr. Fetzer is the architect of our fog warning Spread Spectrum Radio system along with Surface Systems Inc and Sabra Wang & Associates...

SLIDE 3 – We are located in far Western Maryland. I am speaking to you from Cumberland. This map gives you a general idea of where we are in relation to some recent national events.

SLIDE 4 - Read slide.

Big Savage Mt. – one of the mountains we have the Fog Warning System for has an elevation of 2,800 ft.

SLIDE 5 – On May 23, 2003, almost two years ago now….

This crash occurred in dense fog atop Big Savage Mt. Visibility was estimated to be at about 50 ft.

SLIDE 6 - As a result of this crash that received national attention, we were challenged by elected officials, fire and rescue personnel and the public to……

and Keysers Ridge – a mountain 17 miles to the west.

SLIDE 7 – To do this, we faced a number of challenges…..

- Two independent sites 17 miles apart
- Mountainous terrain
- Limited availability of electric and phone. Although we do have fiber – optic lines in the I-68 R/W accessibility to the fiber would be costly and difficult at the points we needed access.
- We wanted warning signs well in advance of the fog areas

- Automatic activation of warning devices

From both our TOC here at D-6 and our State Wide Operations center in Baltimore we can activate numerous devices; changeable message signs, Travel advisory radios and flashers. We wanted this system to activate automatically once low visibility was detected.

- The system had to be at a reasonable cost
- And….Do it now

SLIDE 8 - To meet these challenges Maryland's solution was to

- Make use of existing roadway weather information systems

installed at the two mountain tops to detect fog conditions.

In Clint's presentation he showed you a typical roadway weather information system.

- Strategically locate warning signs with solar powered LED

beacons

- Use spread spectrum radio to communicate between the sensors and signs using existing state communication towers. These towers are located around the state to carry critical radio

communications for numerous state agencies as well as fire and rescue.

- And last – a dial-up phone link between the RWIS and Traffic Operations Centers here at District 6 and State Wide Operations Center in Baltimore. We are part of the SHA over all CHART System.

SLIDE 9 – Once we decided on the basic frame work for the Warning system, we recognized a number of other challenges that Included the need to –

- Upgrade the RWIS operating system to a LINUX system
- A line of sight was needed from the RWIS to the towers and from the towers to the remote signs
- Sufficient battery back up – I will mention more about this later
- No similar system to use as an example…. other than a solar operated radio system that Craig successfully developed to remotely monitor wind speeds on a bridge on Maryland's Eastern Shore.
- Develop a reporting system using the Scan Web framework

- Solar powered repeaters

SLIDE 10 – Here is a picture of a typical sign instillation showing the various components.

SLIDE 11 – We spoke about the line of sight…..

SLIDE 12 – The next several slides show some of the evaluation processes that Mr. Craig Fetzer and our consultant Sabra Wang & Associates went through to determine sign locations using various computer based programs and GIS data.

SLIDE 13 – Big Savage sign distances.

SLIDE 14 – Keysers Ridge and Thayerville tower to over come the lack of line of sight to the eastern sign (explain slides)

SLIDE 15 – Another computer calculation to confirm that we could communicate between the various signs, towers and RWIS. This mapping was done for each proposed location and the final locations.

SLIDE 16 - Basic system components.

System activated on March 7, 2005 and immediately we realized our three day battery capacity was too small – we had a week of solid fog and the system went down in three days.

SLIDE 17 – Questions. Thank you to Ray Murphy from FHWA and Jennifer who helped me through this presentation set up.

SLIDE 18 – Additional contact information. We also have an overview paper that we would like to make available to any one who would like it. We can e-mail it out.

SLIDE 19 – Marylandroads.com for RWIS site information.